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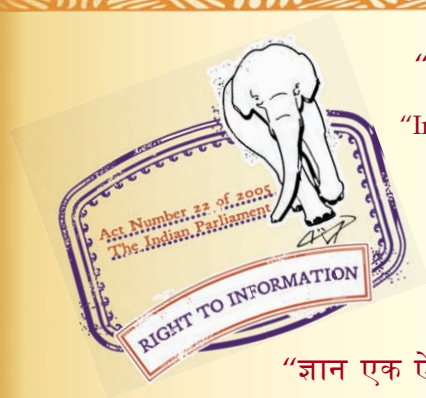
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IS 4178 (1967): Specification for Eynuts with Collars [MED
14: Cranes, Lifting Chains and Related Equipment]



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“Knowledge is such a treasure which cannot be stolen”

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Indian Standard
SPECIFICATION FOR
EYENUTS WITH COLLARS

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Indian Standard

SPECIFICATION FOR EYENUTS WITH COLLARS

Lifting Chains and Associated Fittings and Components Sectional
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Representing

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Indian Standard

SPECIFICATION FOR

EYENUTS WITH COLLARS

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 29 June 1967, after the draft finalized by the Lifting Chains and Associated Fittings and Components Sectional Committee had been approved by the Mechanical Engineering Division Council.

0.2 This specification covers eyenuts with collars. The provision of a collar adds substantially to the strength of an eyenut.

0.3 Periodical annealing is not required once the eyenuts have been manufactured according to this specification. However, the eyenuts shall be subjected to periodical critical examination and when the threads show signs of damage or the eye shows appreciable bruising, the eyenuts shall be scrapped.

0.4 Due to tension in the horizontal portion of the sling, the recommended safe working loads are excessive for eyenuts used in pairs when threaded with a continuous sling the ends of which are assembled on the load hook. Eyenuts in pairs should be loaded by individual sling ends.

0.5 The recommended safe working loads are applicable only when the tension is applied in the plane of the eye, and are much too great if this condition is not fulfilled. Shackle pins should, therefore, always be at right angles to the plane of the lifting ropes or chains.

0.6 The reliability of eyenuts is an important factor and, therefore, it is recommended that supplies should be obtained from manufacturers possessing adequate facilities for heat treatment and testing, and employing competent staff for detailed inspection.

0.7 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard specifies the requirements for eyenuts with collars for lifting purposes.

*Rules for rounding off numerical values (*revised*).

2. TERMINOLOGY

2.0 For the purpose of this standard, the following definitions shall apply.

2.1 Competent Person — The person who is approved and declared as such under the relevant statutory provisions.

2.2 Proof Load — The load to which the whole of the eyenut shall be subjected in the finished condition (*see 7.2*).

3. MATERIAL

3.1 Eyenuts with collars shall be made of material conforming to Class 2 of IS : 1875-1966* or from material with equivalent mechanical properties.

3.1.1 Phosphorus and sulphur content of the steel shall not exceed 0.05 percent each.

3.2 If required by the purchaser at the time of placing the order, the manufacturer shall supply a copy of steel maker's analysis.

4. DIMENSIONS

4.1 The dimensions of the eyenuts with collars shall be as given in Tables 1 and 2.

4.2 The screw thread dimensions of the eyenuts shall conform to Class 8d specified in IS : 1362-1962†.

5. MANUFACTURE

5.1 The eyenuts with collars shall be cleanly forged and the underside of the collars shall be machined. Screw threads shall be cleanly formed, free from checks and imperfections and the finished eyenuts shall be free from defects. The eyes shall not be welded.

5.2 The forgings shall, prior to machining, be raised to a temperature of 875°C, quenched in water and then reheated to 650°C and allowed to cool in air. The forgings shall be descaled by pickling, sand blasting or by any other suitable means. The periphery of the finished collar shall have a hardness of 160 to 200 HB (*see IS : 1500-1959‡*).

5.3 The underside of the collar shall be accurately machined with a flat surface at right angles to the axis as given in Tables 1 and 2.

*Specification for carbon steel billets, blooms and slabs for forgings (*revised*).

†Dimensions for screw threads for general purposes (diameter range 1.6 to 39 mm) (*revised*).

‡Methods for Brinell hardness test for steel.

NOTE — From investigations, it is confirmed that the condition of the surfaces in contact, that is, the underside of the collar and the surface upon which it bears, have great influence on the inclined loading of the eyenut. The smoother the surfaces the greater the resistances when the loading of the eyenut is not directly axial. In this specification, the undersurface of the collar of the eyenut is stipulated to be smooth and flat (*see* Tables 1 and 2) and users are recommended to take equal care in facing the connecting surface which should be equally flat and smooth and at right angles to the axis of the stud. Underside of the tapped hole on the eyenut should be a good fit to the stud on the contacting surface. This specification implies a smoothly machined and true facing of a diameter not less than that of the collar and the recommended safe working loads (*see* Table 3) are maximum safe working loads.

6. GENERAL REQUIREMENTS

6.1 The eyenuts with collars conforming to this standard shall meet with the requirements laid down in IS : 1367-1967* in so far as manufacture, workmanship, tolerances, tests, and packing are concerned.

7. TESTS

7.1 Sampling — The sampling for this purpose shall be in accordance with IS : 2614-1964†.

7.2 Proof Load Test — The eyenuts shall be tested as a combination after threading a standard eyebolt or standard shackle. In addition to the tests specified in IS : 1367-1967*, each eyenut with collar after manufacture and subsequent heat treatment shall be subjected to a proof load equal to double axial working load given in Table 3 which it shall withstand without showing permanent set. After the removal of the proof load, each eyenut shall be thoroughly examined and shall be accepted only when found free from flaws or defects.

8. INSPECTION, CERTIFICATE OF TEST AND EXAMINATION

8.1 The representative of the purchaser shall have access to the works of the manufacturer at all reasonable times for the purpose of witnessing the specified tests and inspecting the machine and methods of examination.

8.2 The manufacturer shall supply a certificate of test and examination as given in Appendix A with every supply of eyenuts. The certificate shall give the results of all tests made.

9. MARKING

9.1 Quality Marking — Every eyenut shall be legibly and permanently marked with the symbol (03) in the hardened and tempered condition

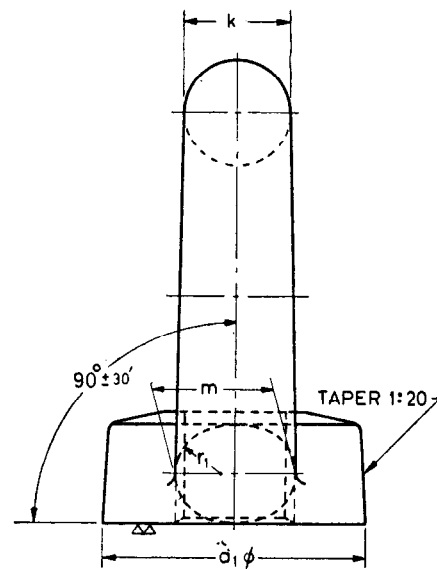
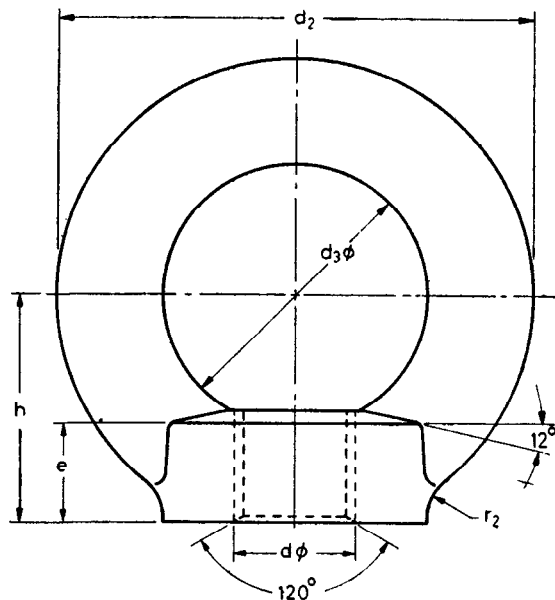
*Technical supply conditions for threaded fasteners (*first revision*).

†Methods for sampling of fasteners.

TABLE 1 DIMENSIONS FOR EYENUTS WITH COLLARS
(RANGE M10 TO M36)

(*Clauses 4.1 and 5.3*)

All dimensions in millimetres.



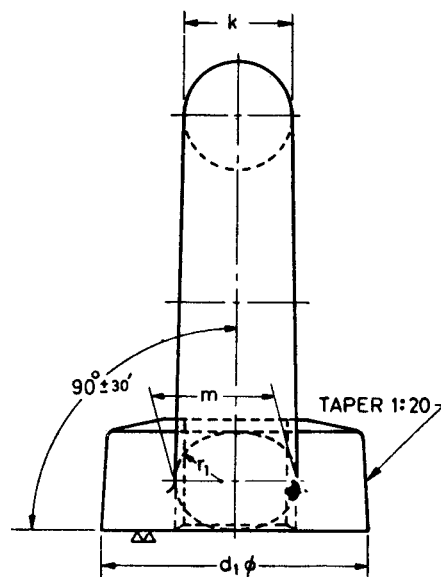
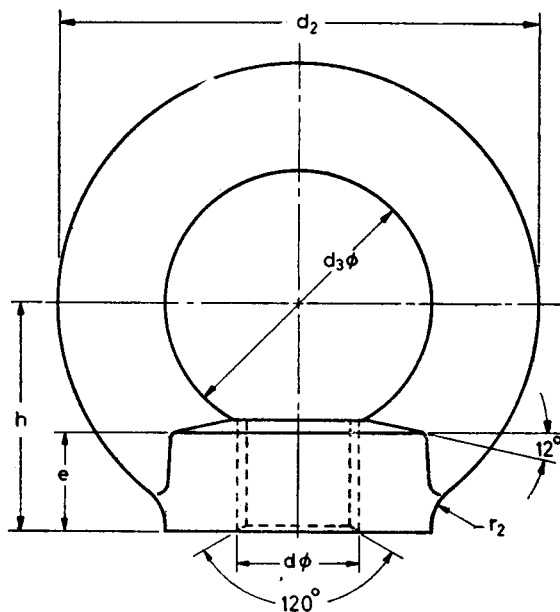
<i>d</i>		M10	M12	M16	M20 M20 × 2	M24 M24 × 2	M30 M30 × 2	M36 M36 × 3
<i>d</i> ₁ js16	<i>Nom</i>	25	30	35	40	50	65	75
	<i>Max</i>	25·65	30·65	35·80	40·80	50·80	65·95	75·95
	<i>Min</i>	24·35	29·35	34·20	39·20	49·20	64·05	74·05
<i>d</i> ₂ js16	<i>Nom</i>	45	54	63	72	90	108	126
	<i>Max</i>	45·80	54·95	63·95	72·95	91·10	109·10	127·25
	<i>Min</i>	44·20	53·05	62·05	71·05	88·90	106·90	124·75
<i>d</i> ₃ js16	<i>Nom</i>	25	30	35	40	50	60	70
	<i>Max</i>	25·65	30·65	35·80	40·80	50·80	60·95	70·95
	<i>Min</i>	24·35	29·35	34·20	39·20	49·20	59·05	69·05
<i>e</i> js16	<i>Nom</i>	10	11	13	16	20	25	30
	<i>Max</i>	10·45	11·55	13·55	16·55	20·65	25·65	30·65
	<i>Min</i>	9·55	10·45	12·45	15·45	19·35	24·35	29·35
<i>h</i> js16	<i>Nom</i>	22	26	30	35	45	55	65
	<i>Max</i>	22·65	26·65	30·65	35·80	45·80	55·95	65·95
	<i>Min</i>	21·35	25·35	29·35	34·20	44·20	54·05	64·05
<i>*k</i> js16	<i>Nom</i>	10	12	14	16	20	24	28
	<i>Max</i>	10·45	12·55	14·55	16·55	20·65	24·65	28·65
	<i>Min</i>	9·55	11·45	13·45	15·45	19·35	23·35	27·35
<i>m</i> js16	<i>Nom</i>	12	14	16	19	24	28	32
	<i>Max</i>	12·55	14·55	16·55	19·65	24·65	28·65	32·80
	<i>Min</i>	11·45	13·45	15·45	18·35	23·35	27·35	31·20
<i>r</i> ₁	<i>Nom</i>	5	5	6	7	9	11	13
<i>r</i> ₂	<i>Nom</i>	4	6	6	8	12	15	18

*‘*k*’ may be equal to ‘*m*’ also.

TABLE 2 DIMENSIONS FOR EYENUTS WITH COLLARS
(RANGE M42 TO M100)

(*Clauses 4.1 and 5.3*)

All dimensions in millimetres.

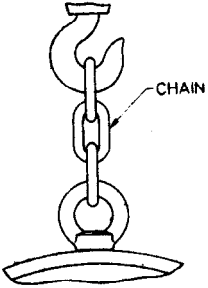
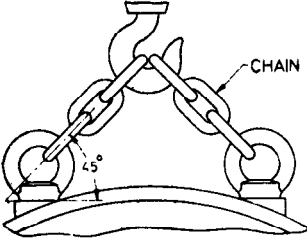


<i>d</i>		M42 M42 × 3	M48 M48 × 3	M56 M56 × 4	M64 M64 × 4	M72 × 6 M72 × 4	M80 × 6 M80 × 4	M100 × 6 M100 × 4
<i>d</i> ₁ js16	<i>Nom</i>	85	100	110	120	150	170	190
	<i>Max</i>	86·10	101·10	111·10	121·10	151·25	171·25	191·45
	<i>Min</i>	83·90	98·90	108·90	118·90	148·75	168·75	188·55
<i>d</i> ₂ js16	<i>Nom</i>	144	166	184	206	260	296	330
	<i>Max</i>	145·25	167·25	185·45	207·45	261·60	297·60	331·80
	<i>Min</i>	142·75	164·75	182·55	204·55	258·40	294·40	328·20
<i>d</i> ₃ js16	<i>Nom</i>	80	90	100	110	140	160	180
	<i>Max</i>	80·95	91·10	101·10	111·10	141·25	161·25	181·25
	<i>Min</i>	79·05	88·90	98·90	108·90	138·75	158·75	178·75
<i>e</i> js16	<i>Nom</i>	35	40	45	50	60	70	80
	<i>Max</i>	35·80	40·80	45·80	50·80	60·95	70·95	80·95
	<i>Min</i>	34·20	39·20	44·20	49·20	59·05	69·05	79·05
<i>h</i> js16	<i>Nom</i>	75	85	95	105	130	150	165
	<i>Max</i>	75·95	86·10	96·10	106·10	131·25	151·25	166·25
	<i>Min</i>	74·05	83·90	93·90	103·90	128·75	148·75	163·75
* <i>k</i> js16	<i>Nom</i>	32	38	42	48	60	68	75
	<i>Max</i>	32·80	38·80	42·80	48·80	60·95	68·95	75·95
	<i>Min</i>	31·20	37·20	41·20	47·20	59·05	67·05	74·05
<i>m</i> js16	<i>Nom</i>	38	46	50	58	72	80	88
	<i>Max</i>	38·80	46·80	50·80	58·95	72·95	80·95	89·10
	<i>Min</i>	37·20	45·20	49·20	57·05	71·05	79·05	86·90
<i>r</i> ₁	<i>Nom</i>	15	18	20	22	27	30	32
<i>r</i> ₂	<i>Nom</i>	20	22	25	25	35	35	40

* '*k*' may be equal to '*m*' also.

TABLE 3 SAFE WORKING LOADS FOR EYENUTS WITH COLLARS

(Clauses 5.3 and 7.2)

DIRECTION OF SLING LEGS ON EYENUTS WITH COLLARS		MAXIMUM SAFE WORKING LOAD <i>W</i> ON THE SLING HOOK IN kgf FOR SIZES													
		M10	M12	M16	M20 M20 × 2	M24 M24 × 2	M30 M30 × 2	M36 M36 × 3	M42 M42 × 3	M48 M48 × 3	M56 M56 × 4	M64 M64 × 4	M72 × 6 M72 × 4	M80 × 6 M80 × 4	M100 × 6 M100 × 4
FOR SINGLE EYENUT		150	220	380	570	1 050	1 700	2 500	3 400	5 200	6 500	8 700	13 000	17 000	20 000
FOR TWO EYENUTS		—	—	—	—	950	1 700	2 500	3 500	5 000	6 300	8 000	11 000	16 000	20 000

9.2 Identification Marking — Every eyenut shall be permanently and legibly marked with the safe working load and also such marks and symbols as will allow identification with the manufacturer's certificate of test and examination (*see* Appendix A).

9.2.1 The stamps should have a concave surface and the indentation should be neither too sharp nor excessive in depth.

The recommended sizes of stamps shall be as given below:

<i>Diameter of Material in Bow Piece</i>	<i>Size of Mark</i>
mm	mm
Up to and including 25	5
Over 25	6

9.2.1.1 The eyenut may also be marked with the Standard Mark.

9.3 The use of the Standard Mark is governed by the provisions of *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

APPENDIX A

(*Clauses 8.2 and 9.2*)

CERTIFICATE OF TEST AND EXAMINATION

DISTINGUISHING MARK	DESCRIPTION OF EYENUTS	MATERIAL	PROOF LOAD APPLIED kgf	SAFE WORKING LOAD kgf
(1)	(2)	(3)	(4)	(5)
...

Particulars of heat treatment to which the eyenuts have been subjected are as follows:

.....

.....

We hereby certify that the eyenuts, described above, comply in all respects with IS : 4178-1967 'Specification for eyenuts with collars' and that they were subjected to the proof load and subsequently examined and passed by a competent person.

Signature

Date

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002

Telephones: 323 0131, 323 3375, 323 9402

Fax : 91 11 3234062, 91 11 3239399, 91 11 3239382

Telegrams : Manaksanstha
(Common to all Offices)

Central Laboratory:

Plot No. 20/9, Site IV, Sahibabad Industrial Area, Sahibabad 201010

Telephone

8-77 0032

Regional Offices:

Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002 323 76 17

*Eastern : 1/14 CIT Scheme VII M, V.I.P. Road, Maniktola, CALCUTTA 700054 337 86 62

Northern : SCO 335-336, Sector 34-A, CHANDIGARH 160022 60 38 43

Southern : C.I.T. Campus, IV Cross Road, CHENNAI 600113 235 23 15

†Western : Manakalaya, E9, Behind Marol Telephone Exchange, Andheri (East),
MUMBAI 400093 832 92 95

Branch Offices:

'Pushpak', Nurmohamed Shaikh Marg, Khanpur, AHMEDABAD 380001 550 13 48

‡Peenya Industrial Area, 1st Stage, Bangalore-Tumkur Road,
BANGALORE 560058 839 49 55

Gangotri Complex, 5th Floor, Bhadbhada Road, T.T. Nagar, BHOPAL 462003 55 40 21

Plot No. 62-63, Unit VI, Ganga Nagar, BHUBANESHWAR 751001 40 36 27

Kalaikathir Buildings, 670 Avinashi Road, COIMBATORE 641037 21 01 41

Plot No. 43, Sector 16 A, Mathura Road, FARIDABAD 121001 8-28 88 01

Savitri Complex, 116 G.T. Road, GHAZIABAD 201001 8-71 19 96

53/5 Ward No. 29, R.G. Barua Road, 5th By-lane, GUWAHATI 781003 54 11 37

5-8-56C, L.N. Gupta Marg, Nampally Station Road, HYDERABAD 500001 20 10 83

E-52, Chitaranjan Marg, C-Scheme, JAIPUR 302001 37 29 25

117/418 B, Sarvodaya Nagar, KANPUR 208005 21 68 76

Seth Bhawan, 2nd Floor, Behind Leela Cinema, Naval Kishore Road,
LUCKNOW 226001 23 89 23

NIT Building, Second Floor, Gokulpat Market, NAGPUR 440010 52 51 71

Patliputra Industrial Estate, PATNA 800013 26 23 05

Institution of Engineers (India) Building 1332 Shivaji Nagar, PUNE 411005 32 36 35

T.C. No. 14/1421, University P.O. Palayam, THIRUVANANTHAPURAM 695034 6 21 17

*Sales Office is at 5 Chowringhee Approach, P.O. Princep Street,
CALCUTTA 700072 27 10 85

†Sales Office is at Novelty Chambers, Grant Road, MUMBAI 400007 309 65 28

‡Sales Office is at 'F' Block, Unity Building, Narashimaraja Square,
BANGALORE 560002 222 39 71